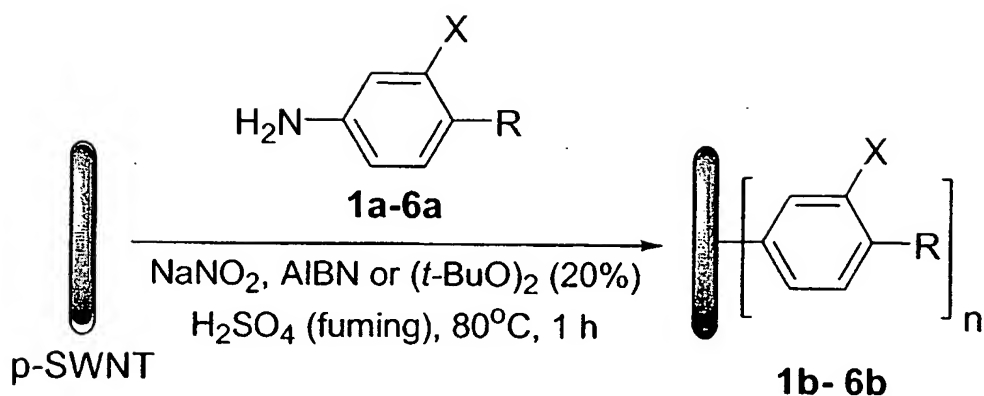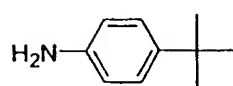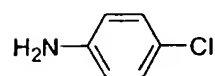**Scheme 1**

1a. R = H, X = H to **1b**. R = SO$_3$H, X = H

2a. R = NO$_2$, X = H to **2b**. R = NO$_2$, X = SO$_3$H

3a. R = Cl, X = H to **3b**. R = Cl, X = SO$_3$H

4a. R = *t*-butyl, X = H to **4b**. R = *t*-butyl, X = H and SO$_3$H (~1:1)[a]

5a. R = CH$_2$CH$_2$OH, X = H to **5b**. R = CH$_2$CH$_2$OH, X = SO$_3$H[b]

6a. R = SO$_3$H, X = H to **6b**. R = SO$_3$H, X = H

Fig. 1
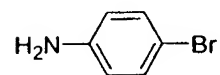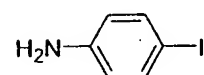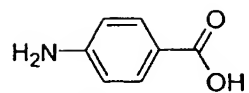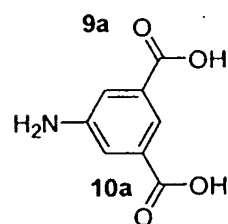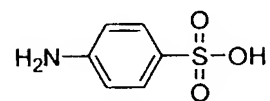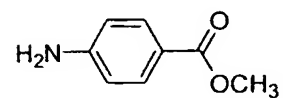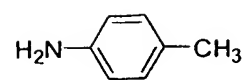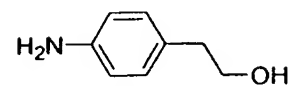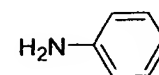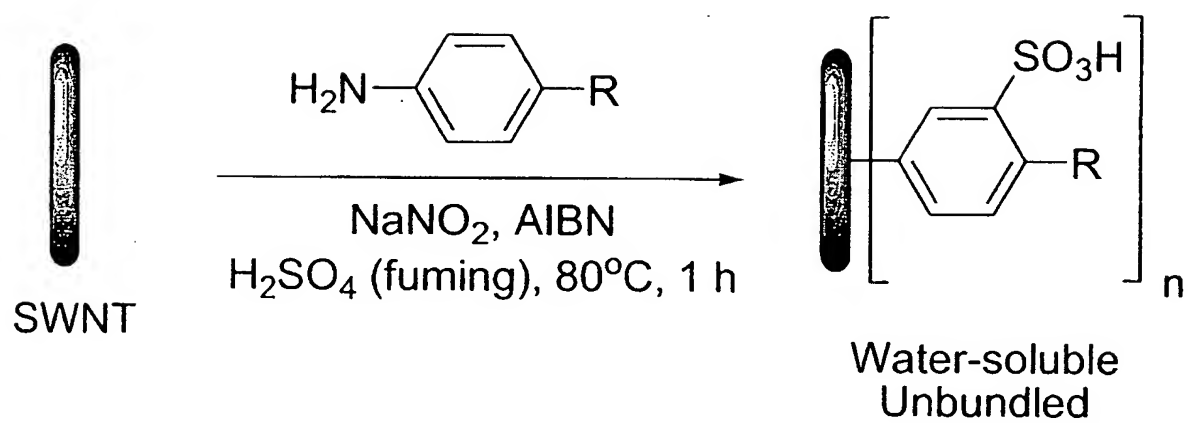
Fig. 2

Scheme 2

SWNT

H_2N—⬡—R

NaNO$_2$, AIBN
H$_2$SO$_4$ (fuming), 80°C, 1 h

⟶

$\left[\begin{array}{c} SO_3H \\ R \end{array} \right]_n$

Water-soluble
Unbundled

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10

A)

1. 96% H_2SO_4
2. $(NH_4)_2S_2O_8$
3.
   H_2N—〈 〉—Cl
4. $NaNO_2$
RT 12 hrs

B)

1. 96% H_2SO_4
2. $(NH_4)_2S_2O_8$
3.
   H_2N—〈 〉 $COOH$
                $COOH$
4. $NaNO_2$
80°C 12 hrs

C)

1. 96% H_2SO_4
2. $K_2S_2O_8$
3.
   H_2N—〈 〉 $COOH$
                $COOH$
4. $NaNO_2$
80°C 12 hrs
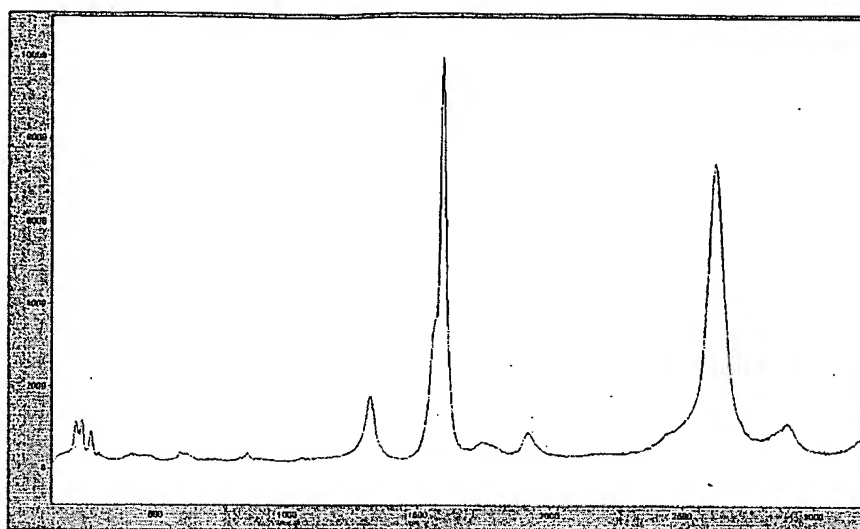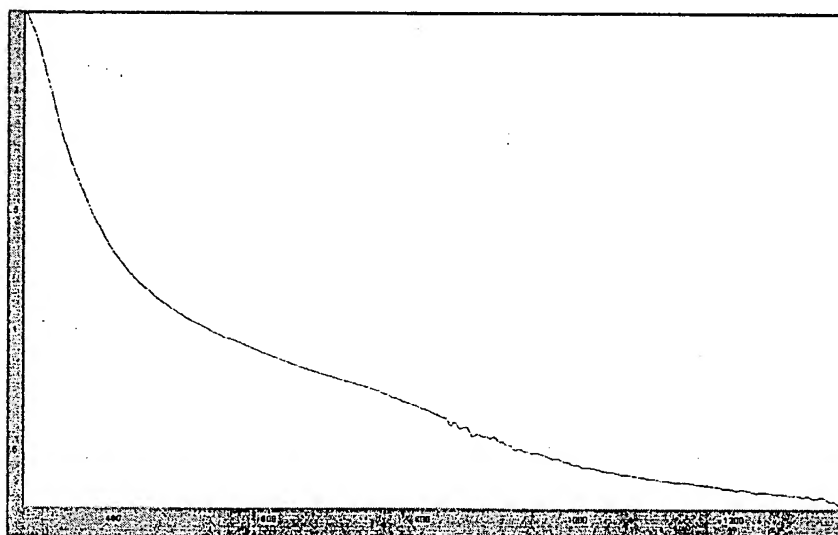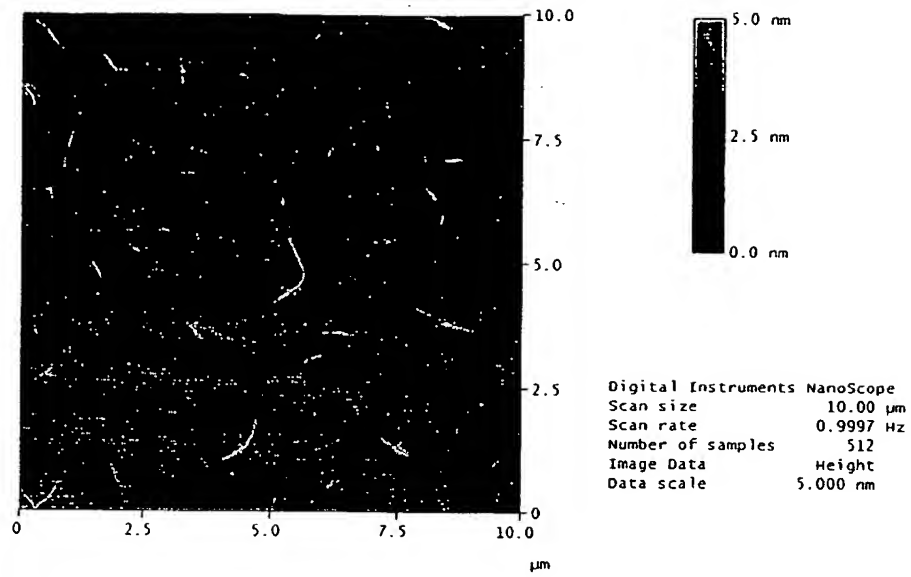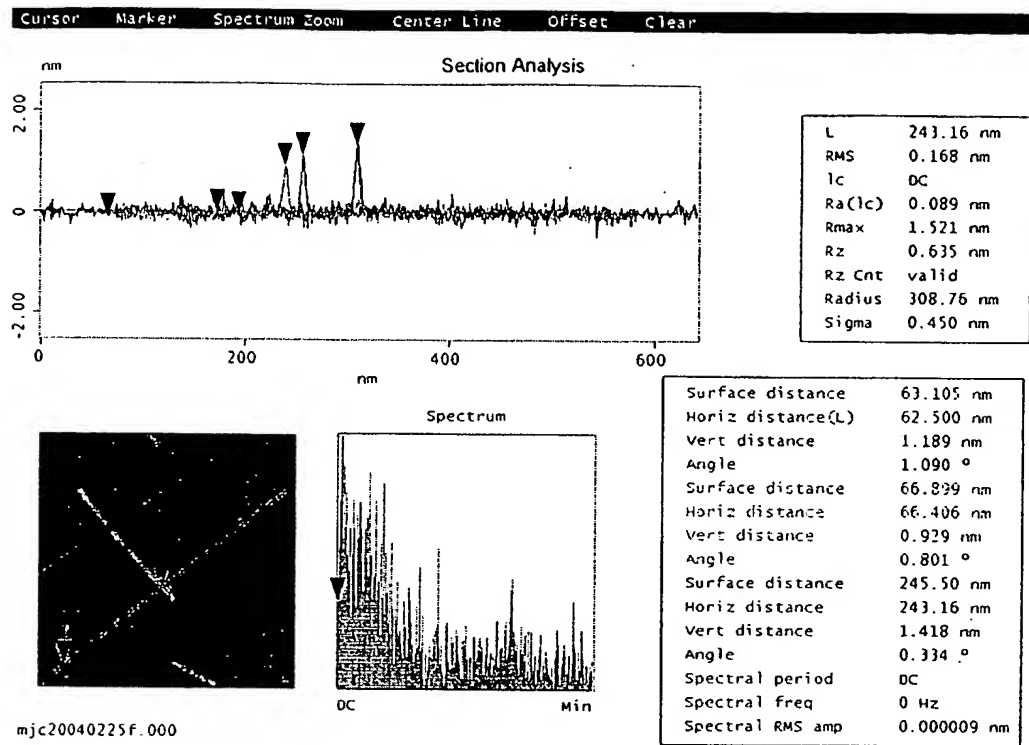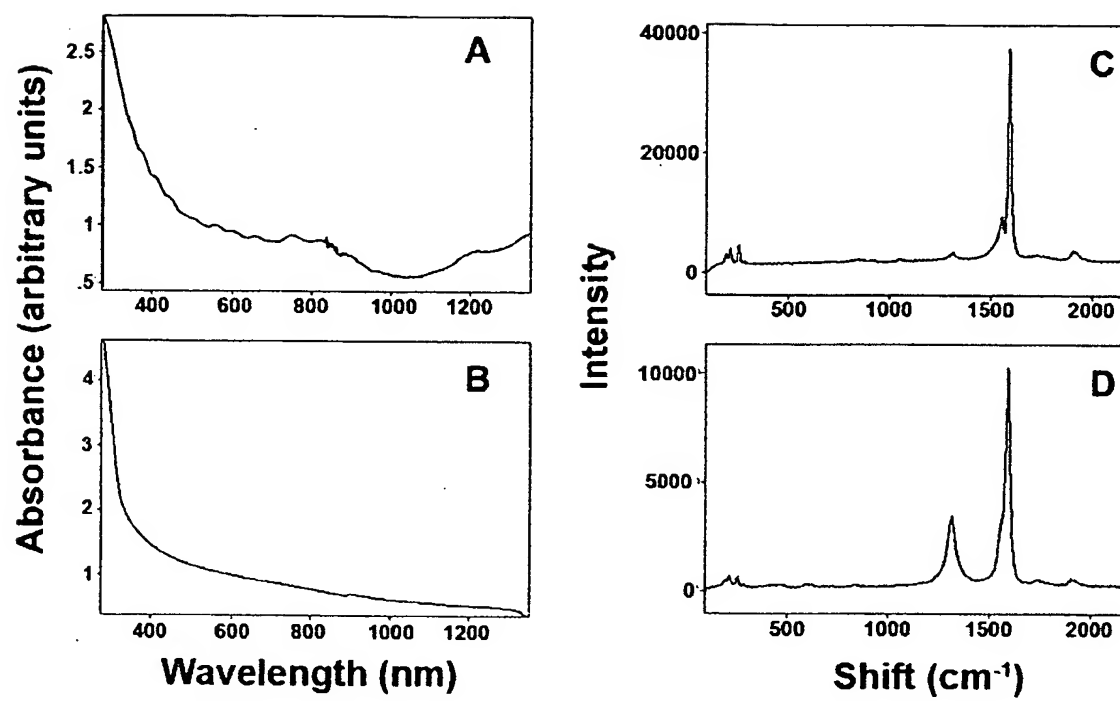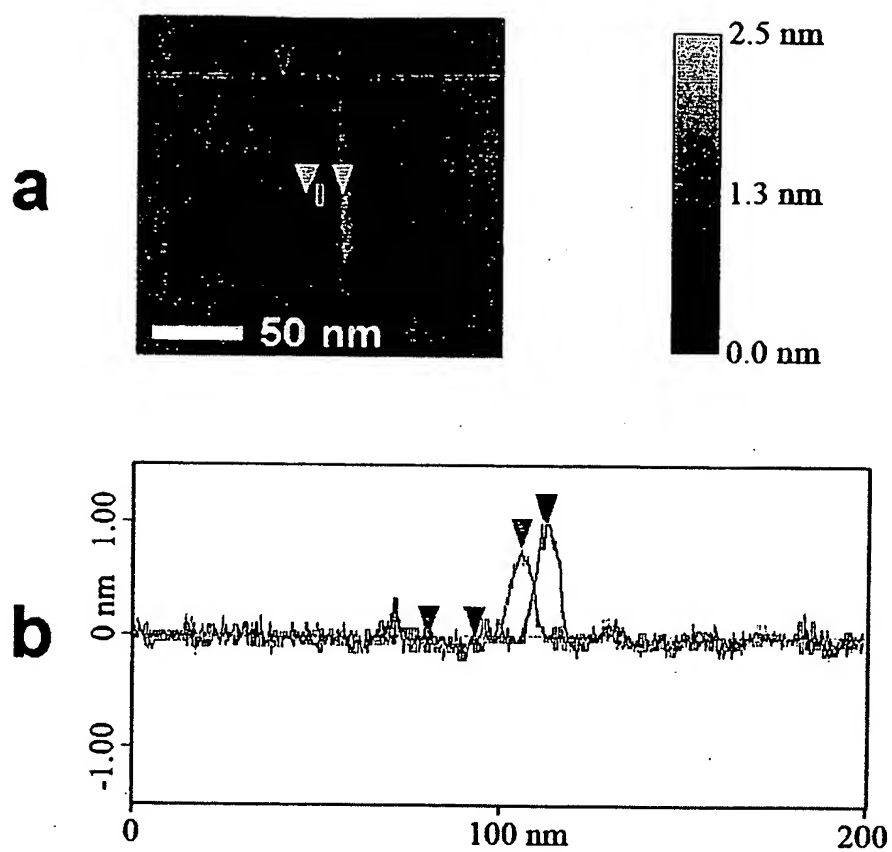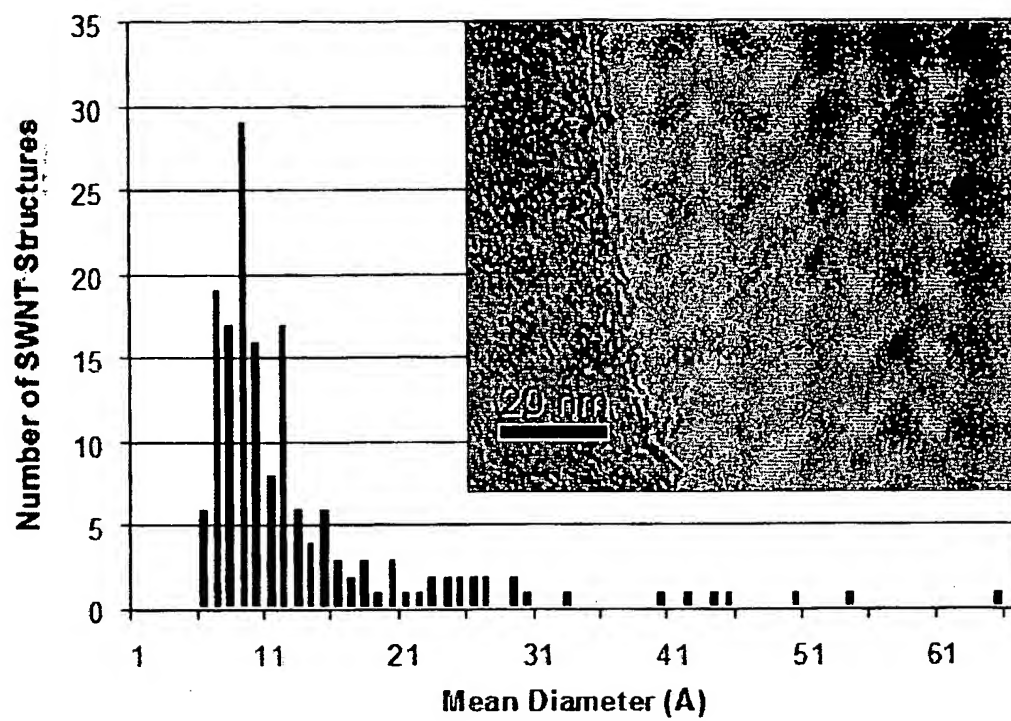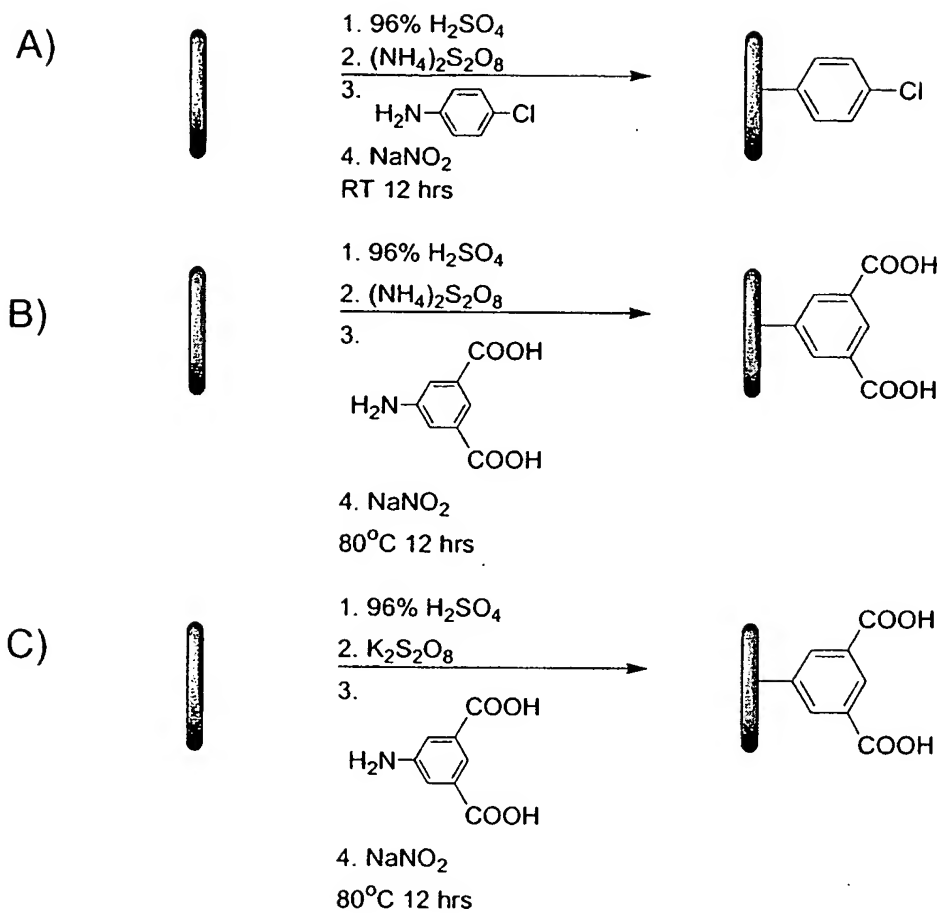
Fig. 11
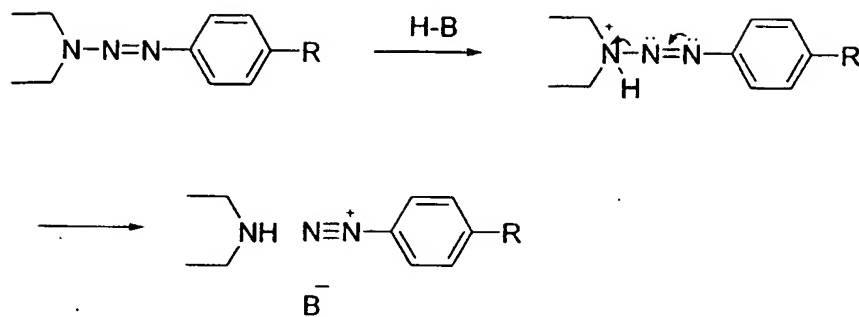
Scheme 3

H-B = Acidic Media

Fig. 12

Scheme 4

SWNT

R = Halogen, Alkyl,
Ester, Amide, Ether

Fig. 13